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DOCTORS AND CITIZENS

Now that the war in Europe is drawing to an end and it becomes possible to assess, if not to comprehend, the extent of the appalling suffering that has been inflicted upon the whole continent by Nazi Germany, it is increasingly obvious that the medical profession will have a major part to play in the prodigious task of reconstruction. Theirs is the legacy of six years of systematic starvation, mass deportations, fiendish torture and organised suffering on the largest imaginable scale. In our own country the physical and psychological effects of the years of war will be important factors in the practice of medicine for years to come.

The work of the doctor is directly affected by the trend of events, by political happenings in his own country and in the world at large. Firstly, in a narrower sense, there are questions affecting the conditions of his service, such as whether he is to be a private practitioner or a salaried servant of the state. Secondly, there is the intimate relationship between health and standards of living. Few would now deny that poverty, overcrowding and bad housing are the allies of disease. All the available statistics show this to be an undisputable fact. Even medical research has its political aspects. For instance, it is doubtful if in peacetime and without governmental assistance such great strides should have been made, in so short a time, in the manufacture and clinical use of Penicillin.

These are only a few of the points where medicine touches politics. The fact that medicine and politics have anything at all in common is distasteful to many, if not most, doctors and students. They resent the possibility that anyone should make political capital out of the prevention or the cure of ill-health—the task to which they have devoted their lives. This distaste has given rise to a deep suspicion of all politics and politicians. Many members of the profession feel it their duty to live up to the medical consequences of the world as it is to-day and to leave to others the consideration of the underlying causes of these troubles.

It is obvious that no practising doctor, to whatever branch of medicine he belongs, can spare time for active political work. Medicine is too jealous a mistress for that. But the fact that he is a doctor does not absolve him of his responsibilities as a citizen. It is his duty to take a lively and reasonably well informed interest in the affairs of the nation. No one desires that he should speak on soap boxes at the street corner between his rounds, or be acquainted with all the finer ramifications of, say, the problem of bimetallism. But it is important that his mistrust of politicians should not blind him to the fact that the organisation of society has a direct effect upon the practice of medicine. Members of the medical profession must remember that they are in addition vital components of a living democracy.

It is likely that in the future, doctors will be subjected to a greater degree of supervision by the state. For better or worse their freedom of action will be to some extent curtailed. It is more than ever important that they should not surrender, voluntarily or by coercion, their right to an opinion, and their right to express that opinion, on the conduct of public affairs.

This is not an appeal to medical students, or to others more exalted, to take part in active political campaigning, but merely to ask them to realise that problems outside their own immediate sphere, have repercussions on their work—upon its nature and upon the conditions under which it is done. Failure to realise this is to allow the profession to be tossed like a cork upon the waters of circumstance and intrigue. The responsibilities that we have in common with every democratic citizen are not lessened but rather increased as a result of our calling.

SOME ASPECTS OF THE HISTORY CANCER RESEARCH

By PROFESSOR E. L. KENNAWAY

In 1775 Percivall Pott published his "Chirurgical Observations," containing an article of five pages on "Cancer Scroti" in which he describes the occurrence of cancer of the scrotum in chimney sweeps. If one reads this essay, bearing in mind the state of medical knowledge at the time, one notes that it contains hardly one superfluous sentence. And there is one passage which is a landmark in the history of cancer research.

> "The disease, in these people, seems to derive its origin from a lodgment of soot in the rugae of the scrotum, and at first not to be a disease of the habit. In other cases of a cancerous nature, in which the habit is too frequently concerned, we have not often so fair a prospect of success by the removal of the distempered part; and are obliged to be content with means, which I wish I could say were truly palliative. But here the subjects are young, in general in good health (at least at first), the disease brought on them by their occupation, and in all probability local; which last circumstance may, I think, be fairly presumed from its always seizing the same part: all this makes it (at first) a very different case from a cancer which appears in an elderly man, whose fluids are become acrimonious from time, as well as other causes; . . ."

Here is at least the recognition that this form of cancer was due to an external agent. Such an external agent might be identified; but it was long indeed before any progress was made in this direction.

Pott refers to the conditions under which the sweeps lived in the following words:

> "The fate of these people seems singularly hard: in their early infancy, they are most frequently treated with great brutality, and almost starved with cold and hunger; they are thrust up narrow, and sometimes hot chimneys, where they are bruised, burned, and almost suffocated; and when they get to puberty, become peculiarly liable to a most noisome, painful, and fatal disease."

He thus gave an early example of that "attention to the home conditions of the patient" which is now advocated as a part of the training of medical students. The life of the chimney sweeps has inspired a curious literature ranging from the poems of William Blake, and the early chapters of Charles Kingsley's "Water Babies," to a whole series of Acts of Parliament passed between 1788 and 1864,* of which the most effectual forbade the climbing of chimneys by persons aged less than 21 years. At that age the human body is too large to enter a narrow chimney and thus a limiting factor was introduced which was independent of any humane considerations.

After Pott's life-time his description of the cancer of chimney sweeps was amplified in some particulars by the surgeons James Earle, his son Henry, and T. B. Curling. After the lapse of a century, in 1875, the German surgeon, von Volkmann, gave a well illustrated description of the similar cancers which occur in the lignite tar workers in Saxony and subsequently the same cases were published over and over again in German journals. Thus between 1873 and 1890 no less than 28 descriptions of ten cases by five authors appeared, and the case of one patient, Friedrich Seidler by name, was described at full length by four different authors (hence the bulk of a medical reference library such as that of the Royal Society of Medicine). Then came the description of cancers due to shale oil (Bell, 1876), petroleum (Derville and Guermonprez, 1890) and lubricating oils (Southam and Wilson, 1922). But none of these authors made any real advance beyond the stage reached by Pott in 1775; they described other forms of the type of occupational cancer which affects chimney sweeps, but they made no closer approach to the problem of ætiology.

The experimental production of cancer by tar brought about in the rabbit by Japanese workers in 1915 led to a study of the immensely numerous constitutents of tar. The field was narrowed by an admirable preliminary investigation by the late Bruno Bloch of Zürich and his collaborators in 1921, and the known high-boiling constituents of tar were soon examined and found to give negative results. The subsequent progress was due to the work on the fluorescence spectroscopy of carcinogenic substances by Mayneord and Hieger, of which the first results appeared in 1930. Their observations led to the discovery of the first carcino-

* The story of this legislation has been summarised by Dr. S. A. Henry (*Amer. J. Cancer*, 31:28, 1937).

genic hydrocarbon, 1:2:5:6 dibenzanthracene (synthesised by Erich Clar, a Czech, in 1929), and to the separation by Hieger from the complex mixture coal-tar of strongly carcinogenic fractions, from which in 1932 a very active compound was isolated, and identified as 3:4-benzpyrene by J. W. Cook and C. L. Hewett. Without the fluorescence spectrum, the testing upon mice for carcinogenic power of every crystalline fraction which one could isolate from tar would have been an extremely lengthy task, and even when a pure carcinogenic compound had been isolated there would have been nothing to direct one's attention to the benzanthracene type of molecular structure. The fluorescence spectrum was the single thread that led all through this labyrinth.*

Two other classes of carcinogenic compounds have been brought to light by investigations independent of those just described. The curious history of the azo compounds has been related by Shear.† This line of research led the Japanese to the use of the azo compound "butter-yellow" for the production of tumours of the liver in rats; the most interesting characteristic of these tumours is their susceptibility to control by dietary factors. Then in 1922 Lacassagne reported, in a characteristically clear, exact and brief paper, the injection of "une preparation extrèmement active de folliculine" into three male mice; "les males ont tous les trois été atteints précocement d'adenocarcinomes mammaires . . ." This remarkable experiment, the first in which cancer was induced by a compound occurring in the body, led in the next ten years to a very large amount of new knowledge about the carcinogenic action of both the natural and the synthetic œstrogens. These three groups of investigations, upon the benzanthracenes, the azo compounds, and the œstrogens, had produced 167 carcinogenic compounds in 1942, when Hartwell published his catalogue.‡ The number now is 284¶, and fortunately the trend of recent discovery is in the direction, not of more complex, but of simpler compounds.

The very numerous carcinogenic compounds which have been discovered in the last 15 years have served, even if they had done nothing else, to dispel some of the rather hopeless mystery which used to surround the whole subject of the etiology of cancer. Thus when one reads one of the classics of cancer research, Jensen's account, published in 1909 under the title "Uebertragbare Rattensarkome,"* of the sarcoma which immortalises him, one is struck by his lack of curiosity about the causation of the tumours, though he mentions the possibility of external, internal, or genetic factors. These tumours occurred in two rats which "some time previously had been inoculated with acid-fast bacilli from a pseudo-tuberculous enteritis of the ox . . . The result of the inoculation was negative, but it so happened that both rats, which had been caged together for a few months, were attacked by sarcomatosis." In one rat the peritoneum, in the other the lungs were affected in this way and Jensen compares the sizes of the tumours, in the classical style of the morbid anatomist, with those of various nuts, legumes, and grains. One notes the absence of any exact statement of the site of the inoculation, or of the interval since it took place. Jensen's attention seems to have been directed especially to the likelihood of a "cage infection" with some unknown agent. He does not even mention the bare possibility that the inoculation had anything to do with the origin of the tumours. Nowadays, I think, an investigator would not ignore this possibility altogether, and he might refer in passing to the work of Rudolf Anderson of Yale upon the chemical compounds produced by the tubercle bacillus.† A large part of the paper is taken up with a rather tedious catalogue of the strains of rats (whose various home-towns ranged from London by way of Hamburg, Copenhagen, Berlin and Dorpat‡ to Japan) in which the tumours did or did not grow. Jensen's paper gives an interesting picture of the days when the outlook of cancer research did not penetrate very far beyond the rather infertile terrain of bacteriology and immunology.

The late H. A. L. Fisher imagined Napoleon's avoidance of St. Helena by a judicious evacuation, in the modern sense, to America after Waterloo. An interesting fictitious history of science might be written on these lines. If Crookes had left some photographic plates near his vacuum tubes he might have discovered X radiation, and Röntgen would have kept his plates in a safer place. And if Casimir Funk,

* The discoverers of benzpyrene were of course perfectly aware that there might be other carcinogens in tar, and recently Berenblum has shown that this is the case, but the compound has not been identified.

† Shear, M. J., *Amer. J. Cancer*, 29:269, 1937.

‡ Survey of Compounds which have been Tested for Carcinogenic Activity. Jonathan L. Hartwell. U.S. Public Health Service.

¶ Spencer, R. R., *J. Amer. Med. Assoc.*, 127: 509, 1945.

* Zeit f. Krebsforsch. 7:45.

† Eleventh Report of the International Cancer Research Foundation, 1943, p. 23.

‡ Jensen classifies these rats of Dorpat, of course quite correctly in 1909, as "russisch"; what their nationality would be now is perhaps doubtful.

who had been the first to suggest that pellagra was a deficiency disease, had had access to cases of it in place of polyneuritic pigeons, when he isolated nicotinic acid from rice bran in 1911, the advance of research on vitamins would have been quickened. And if at the present moment some of us only saw the significance of . . .; and so on. In the history of cancer research there are instances of good and ill-fortune. The discovery of the experimental production of cancer of the rabbit's ear by tar was made by Yamagiwa and Itchikawa at the Pathological Institute of the University of Tokyo and was published in 1915. But this discovery was made, or very nearly made, by Dr. H. P. Bayon at the Lister Institute, London, in 1912.* Bayon injected emulsions of gas-works tar and blast-furnace tar, in lanoline, and of lanoline alone, under the skin of the ear in rabbits which were killed only four weeks later. Ill-fortune attended this well-devised experiment which was defective only in its short duration. After the injection of gas-works tar "the epithelium round the lanoline injected had abundantly proliferated so as to form a thick wall all round, from which epithelial plugs and protrusions took their origin . . . Epithelial cell-nests were both numerous and of considerable size, and presented the stratified appearance which is so distinctive in some cases of squamous-celled carcinoma of the body surface . . ." No such changes were seen in the rabbits receiving blast-furnace tar or lanoline. The figure leaves no doubt that the gas-works tar had produced a new growth which was probably in an early stage of malignancy. The microphoto in the paper shows an amount of epithelial down-growth which nowadays would certainly be held to indicate carcinogenic action, and to suggest repetition, and longer duration, of the experiment. But the author made only the very cautious comment "Of course, it is needless to insist on the fact that these growths differ from true cancer in one very important feature, because, although the epithelium was seen to proliferate actively, still it did not invade the lymphatics and caused no metastatic nodules . . ." In their second paper, illustrated by 54 microphotos, Yamagiwa and Itchikawa in 1917 announced the development of metastases in lymph glands in two of their rabbits after experiments lasting 338 and 366 days. At the present time we do not wait for metastases to develop before concluding that the substance applied is carcinogenic.

If Percivall Pott could emerge from his tomb in the church of St. Mary Aldermary and resume his life in London he would no doubt be surprised at many things. As he walked from the church, he would find prodigious destruction around him, and would wonder by what combination of gunpowder and lunacy it had been brought about. He would go first to his great hospital and would learn that the work of the surgeons, his successors, had not ceased for one hour during this insane period. When he tried to learn of the advances in surgery since his day, to undergo as we should say "a course of post-graduate instruction," he would find with surprise that his own name was preserved not only in connection with a certain fracture, but by the great attention given to a brief note of five pages on "Cancer Scroti," which probably he regarded as one of the least important of his works. He would find that, although we had made immense and continuous progress in the science of demolition, we had been able to add anything of importance to his statement of the causation of chimney-sweep's cancer only in the last 25 of the 170 years since his publication. And when he struggled to master the mass of recent literature about cancer, he would be amazed to see that a large proportion of the new knowledge came from the rebellious American Colonies* which had developed hospitals, and universities, over an area extending even to places on the shores of the Pacific Ocean.†

* *Brit. M. J.*, Dec. 7th, 1912, p. 1579.

* In 1775, the year of publication of his *Chirurgical Observations*, Pott would have heard of the recent appointment by the Continental Congress of a certain General George Washington to command the new American Army.

† The Pacific coast of what is now the United States and Canada was not seen by any British traveller during the two centuries between Drake's voyage around the world (1577-80) and Captain Cook's voyage in 1778, if we except some buccaneers who reached the southern extremity of California in 1709 and 1721. (For information about these latter visitors I am indebted to Mr. G. R. Crone, the Librarian of the Royal Geographical Society.)

The present output of the United States in the field of cancer research is indicated by the publication, in the five years 1940-44, of 710 papers in the journals (*Journal of the National Cancer Institute*, and *Cancer Research*) devoted to this subject, while many important papers appeared in the *Journal of Experimental Medicine, Archives of Pathology, American Journal of Pathology, The Journal of General Physiology, Proceedings of the Society of Experimental Biology and Medicine, Science* and other American journals.

The three great discoveries of tumours induced by a "virus," namely, those of the Rous sarcoma in fowls, of the Shope papilloma in the cotton-tail rabbit, and of the mammary carcinoma of the mouse when dependent on the Bittner factor, were all made in the United States, and only the second of these could not have been made elsewhere.

The importance in the history of cancer research of the form of industrial cancer which Pott first described is the more remarkable when one considers the curious series of chances to which it owes existence, recognition, and the possibility of investigation. At a time which geologists reckon as perhaps 200 million years ago immense quantities of vegetation were produced and these became buried under a huge mass of other deposits. However, the slow but unresting movements of the earth brought the coal during the evolution of mammals at intervals to the surface, and man found it would burn. One wonders who made this discovery; perhaps the spontaneous ignition of an outcrop told the secret. The apparatus of hearth and chimney which man had devised to warm his dwelling acted as a crude retort and condenser, and the products of the destructive distillation of coal were thus collected. The insight of Percivall Pott made the fundamental observation that the cancer occurring in those who removed this distillate was "not a disease of the habit," that is to say, here was a form of cancer due to an external agent. Any further advance would have been difficult indeed if one at any rate of the carcinogenic substances in tar, namely, 3 :4-benzpyrene, had not possessed the extraordinary property of blotting-out with its own fluorescence that of other intensely fluorencent compounds, such as anthracene, in the complex mixture.

THE HEALTH SERVICES OF ETHIOPIA

By J. H. LODGE

(I am deeply indebted to Miss E. Sylvia Pankhurst for an immense volume of information concerning various of the Ethiopian Hospitals. I also wish to acknowledge the kind help of Mr. A. Retta, Counsellor to the Ethiopian Legation, London, and of Dr. Ruth Young, C.B.E., B.Sc., M.B., Ch.B.)

Throughout the world there are probably few countries so ill provided with health services as Ethiopia. This is especially regrettable as the level of public health is desperately low, even as compared with other parts of Africa which may possess a far less temperate climate.

This may be partly attributed to the low standard of hygiene and the almost total absence of sanitation even in the large towns. The water supply is deficient in many cases, a fact which contributes to this state of affairs and places difficulties in the way of any efforts which may be made to raise the standard of public health.

The diseases prevalent in Ethiopia are typhus fever, relapsing fever, pneumonia, syphilis, gonorrhœa, the dysenteries, tropical ulcers, lymphogranuloma, scabies, intestinal worms, trachoma and leprosy. Malaria exists in the lower altitudes.

In view of the nature of these diseases there is evidently a great field for preventive medicine; in fact, Dr. Young goes so far as to say in her article in the *Lancet* that "it would be far more profitable to concentrate on public health and preventive medicine than to develop an elaborate system of hospitals."

This advice, particularly in view of Ethiopia's financial position, seems to me to be eminently sound, and I hope the Ethiopians will take it to heart.

The existent hospitals are, however, quite inadequate for a nation of Ethiopia's size and at present are insufficient to care for more than a small proportion of the seriously ill. As my space is limited, I propose to devote the greater part of this article to the hospitals; for the other health services, where they exist at all, are merely rudimentary; but it must be borne in mind that much requires to be done outside the hospitals altogether.

The first fact to emerge is the gross over-concentration of hospital facilities in the capital. This is a highly unsatisfactory state of affairs, it means that large areas of the country are virtually without any hospitals at all, except for those patients who have the means and are in a condition to be moved enormous distances, which may be as much as some hundreds of miles.

The total number of hospital beds throughout the whole of Ethiopia cannot exceed 1,000 and it is probably at present much lower than this. Many of the hospitals have been closed, either for repairs or from shortage of staff, and such hospitals as are open are all understaffed. The total number of doctors whose services are available to the people of Ethiopia is about 30.

I thought it might be instructive to compare these conditions with those in other countries and I have therefore drawn up the table given below. It should be borne in mind, however, that with regard to Ethiopia these are only approximations and not authoritative statistics, and none exist. While estimates of the popu-

lation of Ethiopia vary from 3 to 16 millions, the most reliable figures indicate a population of 7 to 8 millions.

	Greater London	Gold Coast	Ethiopia
Population	8,204,000	3,617,000	c. 8,000,000
Hospital beds	50,000	1,230	c. 500
People per hospital bed or cot	145 : 1	2,950 : 1	c. 16,000 : 1
	Turkmenistan S.S.R.	Northern Rhodesia	Ethiopia
Population	1,254,000	1,377,000	8,000,000
Doctor	480	20	30
People per doctor	2,600 : 1	68,850 : 1	260,000 : 1

These figures, even allowing for a wide margin of error (I shall not be distressed if their accurracy is impugned) show as nothing else could the seriousness of the situation in Ethiopia.

Ethiopia is not a colony. The advantages of independence are many and overriding, but it also has one disadvantage in that no power need make itself specially responsible in the financial sense for its development. Admittedly a grant of £2,500,000 was made to Ethiopia by Great Britain after the country was freed, but this was a contribution towards all the departments of the work of Ethiopian government and was not sufficient to do much more than to restore the governmental machine which had been smashed as a result of the two wars and the occupation. Only a small part of it can have found its way to Ethiopia's hospitals. This grant was in any case not renewed in the new temporary agreement signed in Addis Ababa last December on behalf of the British Government by Earl De La Warr, and the Ethiopians are consequently beginning to wonder where the money for the upkeep of their hospitals is to come from. The revenues of the Ethiopian state, although increasing, are still not sufficient to cover all the numerous demands upon them. If Ethiopian hospital work is not to suffer, great efforts will have to be made outside the country as well as in to collect sufficient funds to augment the state grants provided by the Ethiopian government. In this connection much valuable work has been and is being done by the Princess Tsahai Memorial Hospital Fund. I would urge all those who are interested in this question to support this organisation, which is doing really valuable work. A ward in this hospital is to be given the name of an old Bart.'s man who gave his life for Ethiopia, Dr. John Melly. So far, however, only about a third of the money necessary to build and equip this hospital has been provided and urgent repairs are needed on many of the existing hospitals.

For example, in her account of the Menelik Hospital, Miss Pankhurst states:—

"When Dr. Dassios took it over he found it filthy and neglected, with sunken floors, plaster breaking from the walls, particularly those built by the Italians with inferior materials; motors, machinery, etc., out of order, many of the parts missing; no tools wherewith to execute repairs. The paint worn off beds and furniture, blankets and linen old, ragged and gravely insufficient, eating utensils totally inadequate in number. The storerooms for sanitary, medical and pharmaceutical material were totally empty; even brushes and cloths for cleaning were absent. The maintenance of the hospital had been seriously neglected under the influences of war and the British authorities, who removed much material for use elsewhere. Of this the Ethiopians made no complaint; whatever was required for the war they willingly accepted."

Similar phrases recur depressingly throughout Miss Pankhurst's reports on the various Ethiopian hospitals and it is only too clear that the hospitals have been very badly neglected, although the Ethiopian government is doing what it can to cope with the situation. A subordinate reason for the dilapidation of the Ethiopian hospitals is that the choice of building materials in the construction of the original buildings was not always wise. Deterioration is rapid in the Ethiopian climate. This is especially, but not exclusively, true of buildings erected during the Italian Occupation. Most of the hospitals mentioned above are, however, pre-Italian.

The two most immediate and pressing needs before the Ethiopian Medical Directorate are the very grave shortage of drugs, and the shortage of staff for the hospitals.

The shortage of drugs is very grave indeed. Miss Pankhurst during her recent visit to Ethiopia asked Dr. Gluk, the Vice-Director of the Ethiopian Health Department, about this question and was told:—

"Of urgent requirements we have only quinine. We have no cod liver oil, no vitamin preparations, no malt—these are all urgently needed for infants. We have no material for injections for grave cases of pneumonia. We have no materials for injections for syphilis."

The shortage of doctors is also serious. There are no qualified Ethiopian doctors with the exception of Azaj Dr. C. Warqneh Martin who is over 80 and retired. Consequently the qualified staff of the various hospitals consists entirely of foreigners. This arrangement has various disadvantages, not the least of which is that European doctors have to be paid at

European rates. The result of this is that Ethiopia is paying some of its medical advisers more than it is paying its Cabinet Ministers! This is a fair indication of the desperation of Ethiopia's financial position. Arrangements for training Ethiopian medical students are being made by the Princess Tsahai Memorial Hospital organisation. I hope we will see some of them at Bart.'s at the end of the war.

The doctors in Ethiopia fall into several categories. There are some missionary doctors in the country, but the number of these is reduced owing to the persecution the missionaries received during the Italian occupation. Then there are the doctors employed by the Ethiopian state and the Army doctors. A branch of the Friends' Ambulance Unit, consisting partly of unqualified personnel, has also done much valuable and unselfish work to restore the disorganised health services of the country, but it has now given notice to the Ethiopian Government of its intention to withdraw before the end of the year. That it has found its task disheartening is evident from the statement it issued on leaving, which says:—

"The Unit has been operating under increasingly difficult conditions; shortage of drugs, funds and personnel added to administrative inefficiency and corruption, make the problems of the Medical Directorate very grave."

In conclusion, I hope that this article, which does not attempt to give a complete picture of the Ethiopian Health Services, will nevertheless make clear to those who are interested the general position in Ethiopia. Those desiring further information I would refer to Dr. Ruth Young's articles in the *Lancet* and the *Journal of the Medical Women's Federation* and to Miss Sylvia Pankhurst's articles in the *New Times and Ethiopia News*.

USELESS CREATURE MAN

Men are what women marry. They have two feet, two hands, and sometimes two women, with never more than one shilling or one idea at a time. Like Turkish cigarettes, they are all made of the same material, the only difference being that some are better disguised than others.

Generally speaking they may be divided into two classes, husbands and bachelors. A bachelor is an eligible man entirely surrounded by suspicion. Husbands are of three types; prizes, surprises and consolation prizes. Making a husband out of a man is one of the highest plastic arts known to civilisation. It requires science, sculpture, common sense, faith, hope and charity, mostly charity. It is a psychological marvel that a small, tender, violet-scented thing like a woman should enjoy kissing a big, awkward, stubbly-chinned, tobacco-scented thing like a man.

If you flatter him you frighten him to death, if you don't you bore him to death. If you permit him to make love to you, he gets tired of you in the end, if you don't he gets tired of you in the beginning. If you agree with him in everything you cease to interest him, if you argue with him you cease to charm. If you believe all he tells you he thinks you are a fool, if you don't he thinks you a cynic. If you wear gay clothes, rouge and silly hats he hesitates to take you out, and if you wear a little brown beret and a tailored suit he takes you out and stares all evening at women in gay clothes, rouge and silly hats. If you join in the gaieties and approve his drinking he swears you are driving him to hell, if you don't and urge him to give up the drink, he vows you are snow and ice. If you are the clinging type he doubts if you have a brain, if you are a modern, advanced, intelligent woman, he doubts whether you have a heart. If you are silly he longs for a bright mate, if you are a brilliant he longs for a playmate.

Man is a worm in the dust. He comes along, wriggles for a while and finally some bird gets him.

ABERNETHIAN SOCIETY

On May 22nd Mr. C. S. Lewis will read a paper to the Society on "Science and Sentiment."

All contributions for the June issue should reach the JOURNAL *Office by Monday, May 14th.*

THE SERPENT TEMPTED ME..... ANTHONY

The following piece of confidence was among those of a certain History tutor of the bluest of blue hosiery establishments in this land. How it came into my hands I dare not relate, but I can't see that there's any secret about it now.

The girls of Polynesia
are extrovert and calm;
Untroubled by dyschezia
Their guts can take no harm.
Their viscous flow is easier
Because they do not fuss.
Our splanchinc crypts are cheesier;
In spasms of æsthesia
An autonomic seizure
Will be the end of us.

NAT.

SUPERVOLTAGE X-RAY THERAPY — A REVIEW

By PROFESSOR W. V. MAYNEORD

Mr. Phillips's account of supervoltage X-ray therapy describes the results of one of the most interesting and important radiological investigations carried out in this or any country during the last twenty years, and is of particular importance in as much as it represents the only attempt outside the United States of America to use voltages of the order of one million for therapeutic purposes.

The development of the technical weapons of radiation therapy has proceeded apace driven by the necessity for obtaining greater and greater penetration of radiation in order to deal effectively with lesions at greater and greater depths. The Report gives an admirably clear history of the development of the Department and of the X-ray tube and high-voltage equipment built under the direction of Dr. Allibone and his staff in the High Voltage Research Department of Metropolitan-Vickers Electrical Co., Ltd.

It would be out of place here to discuss technical detail, but no one reading this account could fail to be impressed by the magnitude of the task successfully undertaken and the technical skill and experience brought to bear upon it. Close collaboration between Hospital and Industry has unfortunately not been developed in this country to the extent attained in the United States, but the million volt experiment at St. Bartholomew's Hospital is certainly an outstanding example, of which it is hoped many more will follow. The great size and weight of the installation cannot fail to impress even the casual observer, but we would rather dwell upon the infinite patience and skill required to develop the equipment and gradually to raise the applied voltage from 600 kV. during the first week of operation, to 750 kV., and finally to 1,000 kV. Since 1940 the apparatus has been wholly occupied with the treatment of patients, but owing to the war there has been little opportunity for laboratory experiments, so that part of the programme concerned with the biological effects of supervoltage X-rays has not been able to be carried out, but the physical investigations for example of the "quality" and output of X-rays emitted by the apparatus have been performed with skill and persistence largely by Mr. Innes. The mass of data reported in the brochure has extended very considerably our knowledge of the radiations produced at high voltages, and forms one of the most complete and outstanding studies carried out in medical radiology in this country.

The author modestly states that the book is no more than an interim report on an investigation into the value of supervoltage X-ray therapy, and it is clear that the investigations have been severely limited in scope in an attempt to obtain a clear-cut answer as to whether or not the biological effects of radiations produced at different wavelengths are of significance. The techniques used in the treatment of patients have therefore been modelled on those found most suitable at 200 kV., and it is much to be hoped that this restriction will soon be able to be removed and the scope of the experiments widened. It seems probable that no simple answer to this question of wavelength dependence can be given, and as demonstrated in the Report the change of voltage introduces other geametrical and physical factors such as change of penetration, total energy absorbed, scattered radiation from the patient, all of which affect the final clinical result. It seems clear, too, that the predictions on physical grounds that the techniques using small accurately directed fields are likely to prove most advantageous are borne out.

Many will turn to the chapter on "Clinical investigations" to see whether or not the results of treatment with a million volt apparatus are substantially an improvement on those obtained at lower voltages, for example at 200 kV. The author rightly emphasises the provisional nature of the results. It is, however, of great interest that the amount of radiation required to produce an erythema on the skin at 1,000 kV. is very substantially higher than at 200 kV. In the opinion of the reviewer this is still one of the mysteries of medical radiology, and calls for very much more research before the answer is found.

The main groups of patients discussed are those requiring treatment for inoperable carcinoma of the breast, carcinoma of the cervix uteri, malignant disease in the upper air and food passages, carcinoma of the rectum, carcinoma of the œsophagus, carcinoma of the bronchus, tumours of the central nervous system, malignant disease of the thyroid and parotid glands, as well as other miscellaneous examples of malignant disease.

It is indeed clear that the million volt X-ray installation has justified the wisdom of those who have contributed to the development of

radiotherapy at St. Bartholomew's over the last quarter of a century, for significant differences in favour of supervoltage are found in the treatment, for example of carcinoma of the breast and maxilla, and in addition a striking improvement in the results of treatment of carcinoma of the rectum. This latter group forms perhaps the most outstanding advance in clinical result, and it is of interest that this site is one in which the physical advantages of the use of a million volts might be expected to accrue. It is, however, doubtful whether the improvement in results is to be interpreted solely in terms of increased radiation at a depth for a given skin dose. This is shown in the case of carcinoma of the œsophagus, for although here, too, the dose at the higher voltage is appreciably larger, the end results are determined not by purely physical considerations but rather by tissues healing under adverse conditions, so that the physical improvement leads to disappointingly little change in the end results.

With the end of hostilities many difficulties which have beset this notable experiment should be removed and the fundamental investigations into the biological effects of these very high voltage radiations will, it is hoped, be pursued even more vigorously than hitherto. It is generally felt that the physical weapons are now available and that the great limitation on progress is fundamental knowledge of the biological effects of the radiations. The book under review is a very notable contribution to the physical advancement, and the author and all those connected with the development of high-voltage research at St. Bartholomew's Hospital are greatly to be congratulated on having achieved even this interim stage of development.

Of the text of the Report itself, which is published by the Sir Halley Stewart Trust which with the British Empire Cancer Campaign has very largely financed the investigations, it can only be said that it is admirably clearly written, and well produced and illustrated.

SUPERVOLTAGE X-RAY THERAPY: A report for the years 1937-1942 on the Mozelle Sassoon Supervoltage X-Ray Therapy Department, St. Bartholomew's Hospital. By Ralph Phillips, M.S., M.B., F.R.C.S., D.M.R.E.

CORRESPONDENCE

INTRAVENOUS TRANSFUSION

To the Editor, St. Bartholomew's Hospital Journal

Dear Sir,

The article in the January number of the JOURNAL on intravenous transfusion is full of practical hints and should be of assistance both to beginners and also to older people. There are, however, some points which "Pentothal" does not mention and which my chief assistants and house physicians have found very useful when difficulties arise.

(1) Finding a vein. When the arm or leg is warm the vein is usually easy to find, but if the patient is cold or "shocked" it may be very difficult. The limb should be wrapped in a towel wrung out in hot water in order to make the skin very warm. This will bring much extra blood to the skin and superficial tissues and the small superficial veins will fill with blood when the upper part of the limb is compressed. The heat of the towel should be tested to avoid scalding the skin.

(2) The antecubital vein should be used only in emergency. If it is used, the patient has to keep his arm still all the time the drip is given or the needle will slip out. It is usually necessary to fix the arm with a splint and this adds greatly to the discomfort of the patient if the transfusion lasts several hours. If a vein of the forearm or leg is used the patient can move the limb and will be much less uncomfortable.

(3) The transfusion, as "Pentothal" points out, should be given by a needle and the drip will usually run for 24 hours or more. When the transfusion stops, another vein can be used. It is unnecessary to cut down and tie in a canula unless the veins are very small and will not fill with blood in spite of warming the limb or when the patient is being moved to and from the theatre. Needless to say, a canula should never be tied into the antecubital vein as this entails the destruction of the vein and reduces the number of veins which the pathologist can use subsequently.

(4) Local Anaesthesia. If a needle is being inserted into a vein, sufficient procaine should be injected intradermally to make a very small bleb. It is unnecessary to inject any into the subcutaneous tissues unless a canula is being inserted.

(5) Insertion of needle. "Pentothal" rightly says that the needle should be inserted into the vein at an angle of 30 degrees, but he then says that the point of the needle should be lifted and pushed well up the vein. I think it is better to say that the butt of the needle should be lowered and the needle pushed up the vein parallel to the surface of the skin.

(6) "Pentothal" suggests that the blood should be warmed by placing it in water which is pleasantly warm to the hand. This procedure is quite safe, but it is safer not to warm the blood at all. If the bottle of blood is kept in the ward for 15-30 minutes before starting the drip it will be quite warm enough. I know of one patient who had anuria as the result of the blood being warmed too much.

(7) The complication of an air embolus is a danger which must always be remembered, especially if the rubber connections are old. A careful watch on the level of the fluid in the drip chamber should be kept. The drip chamber should always have a side tube which allows the level to be easily adjusted.

(8) Vein spasm. "Pentothal" mentions that it is sometimes necessary to force the blood into the vein by producing a positive pressure. He suggests that a Higginson's syringe should be used for this purpose. This will be sufficient if the spasm of the vein is slight, but will not give enough pressure if the vein spasm is severe. When this condition exists it is necessary to put a ligature on every rubber-glass connection and so prevent a loss of blood if the connection slips off. The positive pressure is best produced with the bulb and bag of the blood pressure apparatus. The bag is loosely coiled so that it contains a fair amount of air. A large positive pressure can be produced if it is necessary and the pressure can be maintained by an occasional squeeze of the bulb. The vein spasm usually passes off gradually, but a careful watch must be kept on the rate of flow and the positive pressure reduced if necessary by releasing the valve. It should be mentioned that there is no risk of producing an air embolus though there is a danger of forcing a small clot in the needle into the vein. This possibility should be considered before great pressure is exerted. "Pentothal" mentions the injection of 1.7 cc. of Nikethamide intravenously for the relief of the vein spasm and this should be tried before using considerable pressure.

I remain,
Yours truly,
GEORGE GRAHAM.

149, Harley Street,
London, W.1.
April 10th, 1945.

CONSCIENCE

To the Editor, St. Bartholomew's Hospital Journal

". . . our Abernethian Room is constantly filled by people of a very high grade of intelligence." This statement in the JOURNAL Editorial was probably read by many, as it was by me, with perhaps a little surprise at its frankness, but without undue disbelief. Indeed, there may even have been, deep down, a degree of self-congratulation.

Since then, I have been pondering this and allied subjects.

Are we really justified in considering ourselves as being of fairly uniformly high intelligence? Do we not consider that our intelligence alone is sufficient justification for our privileged position? Are we not rather self-satisfied with our abilities? When we are upbraided by the lay Press for our occasional irresponsible behaviour and our apparent ineptitude for our task do we not tend to place our favour with the contributor to this JOURNAL (November, 1944) who affirmed our competence when the need for responsibility arises, and disdain the assertions of the former? And when the subject of our reservation from call-up arises, do we dismiss it with the oft-repeated platitude that we are doing essential work, and that anyway we shall be called-up when we have done a six-months' house-job: probably rounding it off with a crack about Tokyo or Burma?

I do not in any way question the vital necessity for doctors, or the wisdom of leaving medical students virtually untouched by the National Service Act. What does rile me is the smug way in which we accept it all; the way we talk placidly about being brought up with no thought other than that of going in for medicine—of the obviousness of continuing with this worthy desire even when the war started; the facility with which we stress the difficulties of starting to do medicine after being in the Services; the lack of consideration of others who either gave up medicine when the war started, or who will have just as much difficulty in finding a livelihood after the war; the insufficient realisation of our responsibility to those who have been fighting in our places, and making it possible for us to continue our work relatively undisturbed; and, most of all, the regularity with which consciences are perjured when qualification approaches and the prospect of further deferment becomes a matter of immediate concern.

It is often said that the average Serviceman, when consulted, is adamant about the need for doctors and the training of them; and that Service doctors consider that a period of military service is not a thing to be desired. It is astounding how many of our contemporaries make this excuse when upbraided for spinning out their examinations more than their fellows, or blatantly doing negligible work. Worst of all, to my mind, is the frequent spectacle of one who repeatedly affirms his intention of joining up after one house-job, but jumps at the chance of further deferment when the time comes.

I have headed this outburst "conscience," but I might well have called it "conscience and complacency." We think in very muddled fashion where we ourselves are concerned; we consider ourselves a lot of good types; we are for the most part good-naturedly snobbish; we are easily riled by our harder-working fellows; and we are casually cynical about our duty to our fellow-beings—we dismiss it as mistaken patriotism. Patriotism signifying blind national fervour is very little our concern as doctors; but patriotism which embodies our responsibility to all and sundry, in the future, and in the present to those who are more directly concerned in the war, should be foremost in our minds. Admirable as it may be to attain higher qualifications in this world of competition, it is armour for the future, and our whole concern should be for the present. The perilous position of medical practice at the moment may exaggerate the advantages of specialisation in the post-war world; but general practice is, and always will be, the backbone of medicine, and only by orientating our outlook now shall we attain that perspective on medicine, and all that it embodies, which will give us the true valuation of it, and enthusiasm for it, which will sustain us against the tentacles of political encroachment, and give the country an efficient medical service which only doctors can provide.

Yours sincerely,
"ENDOGENOUS."

The Abernethian Room,
St. Bartholomew's Hospital.
April, 1945.

MORE THOMPSON-BAITING

To the Editor, St. Bartholomew's Hospital Journal

Dear Sir,

Mr. Thompson, in his letter to the March JOURNAL, raises the question of what should be said to a patient whose prognosis is hopeless.

He states correctly, that the difficulty lies in deciding between deceiving the patient and disturbing his peace of mind. He implies, however, that, after divine consultation, one should always sacrifice the latter. It is here that I disagree. I think the decision should be based mainly upon an assessment of the patient's strength of character, moral philosophy and degree of self-control.

A doctor once remarked that a patient who has the courage to ask if he is going to die, has the courage to hear a truthful answer. I think this is

quite wrong. Many poor creatures anxiously await a hopeful reply and I think they should be given one.

Other factors which may influence one's decision are financial considerations and religious faith. I would suggest that it is possible to persuade a patient to "put his affairs in order" without telling him quite how hopeless his condition is; and I would like to point out in the second case that it is the religious belief of the patient which should be considered, and not that of the doctor.

It is worth while remembering that even those who believe in post-mortem survival are often quite as reluctant to attain celestial happiness as their less credulous brethren.

Yours sincerely,

P. H. MOORE.

49, Coval Road, S..W.14.
April 14th, 1945.

METHINKS THIS MAN PROTESTETH TOO MUCH

To the Editor, St. Bartholomew's Hospital Journal

Dear Sir,

I am glad that my friend Mr. Rampion Hurst has been given the opportunity of taking part in this discussion, although his apocryphal assumptions on the matter are too familiar amongst those who will read this correspondence to need any further publication. There is, however, contained in his letter a universal and fundamental error of dialectic, beside which all else that he mentions is trivial. It occurs at the end of the long paragraph addressed to me, in his neat summary of the causes by which he supposes a Christian believes. The error is one which must be put right forthwith, so that if it underlies any continuation of this correspondence or discussion arising therefrom, it may be clearly spotted and ruthlessly extracted, with the collapse of whatever argument may form its superstructure.

But before the exposure there is some business of the routine of courtesy. I defend Mr. Thomson. He was doing little more than commenting on what was to him in the February Editorial conspicuous by its absence. His questionnaire was quite relevant to the Editorial, which he scarcely seized upon as a preamble by something which you, my dear Rampion, meanly suggested he wanted to get off his chest. Our Editor has asked for correspondence. I hope you have not changed his mind.

I apologise to Sam Thomson if I have deprived him of his right to hold his own opinion, but it seemed to me, Sir, that there was something in your choice of superscription that did not deprive him of the right, so much as mock the "opinion" itself—as if you had written "Fad," or indeed as our friend Rampion actually did write, "Bees in the Bonnet." I apologise to you, Sir, if I was wrong.

I had supposed the meaning of my apparently nebulous letter to be clear. May I restate briefly? I meant that the chief truth is not so much that these questions, "What is the meaning of life? What am I living for? etc.," have not been asked, as that it is assumed that they are answered. I suggested some such answers. Secondly, that there is a universal natural law of which natural virtue (common decency) is an expression. The Evangelist St. John interprets the active principle in this law as being from God: the Light which was from the beginning (and now appears as a Man) is the true Light which lights every man. The Good Pagan and the Christian walk together in this Law. But there is a Supernatural Law which is beyond the scope of the Natural. For instance, the Supernatural has something additional to say about Death.

May I, my dear Rampion, restate also our disagreement? Your claim is that more and more people are doubting the authority, by condemning the arrogance, of Catholic Doctrine, and realising that "such problems are beyond the comprehension of creatures only equipped with our very much limited organs of perception." The truth or falsehood of our respective claims can only be decided firstly by making sure what they mean, and secondly by statistics, but on your statement calling for agnosticism and what immediately follows it in your letter, let me first say how much I share your feelings (though "comprehension was unnecessary; we can never do more than apprehend). The point you touch is an old one—it is the absurdity of belief. The absurdity of which you and most people are only too aware, and many Christians not aware enough. It is as G. K. Chesterton said, "A man who has lived and loved falls down dead, and the worm eats him. If a man can believe in spite of that, he can believe in spite of anything." The philosopher expresses it as the scandal of particularity—the scandal that the Creator of the vast "tracts of space and time" and the Author of the "powers that govern the universe" should, not only be concerned with our transient "microcosm," but actually enter into it at a certain place and time, as a "little baby thing that made a mother cry"—that is, by the usual obstetric route taken by every man of the microcosm who came before and after. The scandal is made more shocking by this infant's subsequent life and execution.

You see, my dear Rampion, it is ridiculous. And we recognise it as well as you do. But that we *assume* (a) to know the nature of "the unknowable powers that govern the cosmos" (actually we are limited to expressing "them" by human analogy) and (b) "their" condescension to usward, I emphatically deny. Rather we labour under the burden of believing it. Nor did our fathers before us assume. They were far too awe-struck to assume in the face of such a cosmos. (In fact, except for the poetry, you have repeated much of their writings as we have them. Then, but scarcely now, was recognised the ephemerality of man, who is as grass that withers and is gone.) But they somehow knew that its Maker was (somehow) concerned with them, and from that knowledge came the wonder—"When I behold the heavens and the work of Thy fingers, what is man that Thou art mindful of him?" They believed and then could not understand. It is not that they were, (?) as you are, awed, and then refused to believe.

And don't forget, my dear Rampion, that I may, with no more unfairness, say of you that you are just as successful in wish-fulfilment: first comes the desire for something to hold in awe, then the realisation of "the terrifying perspective of the stars," then the refusal to admit any knowledge of the Governor lest your awe should be clarified and dispersed, and finally the satisfaction of the desire by holding in derision those who are foolish enough not to refuse belief. I think you rather enjoy being a microcosm, Rampion.

To this and your concluding epigram on Death and the Grave is closely applied the principle, anonymously stated, that "There is not when there was not." That is to say, briefly, if God had not said what He meant, if He hadn't expressed Himself in a Word, that is (by analogy) a Man, Death and the Grave (and, for that matter, most of all, Life) *would*

be enigmatic, we should not even see through a glass darkly, God would have remained Deus absconditus, and we should have been forced to be purely spiritual, nearly conjectural. But the Word has been made flesh, and actually dwelt among us. (I tried to indicate earlier on that in Jesus all the intellectual problems are not solved. Rather they are made. We may have been puzzled before; now we are stupefied.)

In your concise statement on belief, which you grace with the salutary preface "it seems to me . . .," you have left something out. You tell us how, but you do not tell us why we believe. You have a tragic devotion to causes and a heartless neglect of reasons. "The assigning of causes for a belief has in itself nothing to do with the question of its truth."

This, Mr. Editor, is the error which I mentioned at the outset: the typically modern Error which must be ruthlessly laid bare before there can be any further discussion. The smallness of the print of the correspondence columns forbids any more here. Since I have found the words of that wisdom for which I have lately been looking, and which I inherit, not in my mind (except to endorse and edit), but for my pen, to record, I offer this adjacent exposition for publication elsewhere in the JOURNAL.

Yours sincerely,

J. M. COZENS-HARDY.

10, Abercorn Mews,
N.W.8.
April 15th, 1945.

Mr. Cozens-Hardy, having been somewhat lavishly gifted with what is known to the proletarait as the gab, has written a companion article to the above—"The Modern Error." Its length compels us to print it in another issue. Mr. Rampion Hurst has been seen reading the above letter.

SPORTS

HOSPITAL SEVENS

United Hospital Seven-a-sides, Richmond, April 7th.

"Sevens," other things being equal, is a form of sport for those who are very fit, and as the afternoon wore on, it was palpably obvious that only one of the teams engaged could be considered in any way fit. This team was St. Mary's Hospital, who are to be congratulated on winning this annual event for the fifth time in six years. They had studied the art of sevens, and were trained to the minute, and gave a well-nigh faultless exhibition. Surprisingly enough it was St. Thomas' Hospital who gave them their closest game; Middlesex were on paper the second best team, but a chapter of accidents prevented their giving of their best in the final against Mary's, but even if these accidents had not occurred it is extremely doubtful whether the final result would have been very different.

Bart.'s, who had done no special training for the sevens, came up against King's in the second round, and started off with two quick and easy tries by Davey in the first few minutes. It seemed that we were going to walk away with it, and we then prepared to save our energies for the next round. However, King's were not intimated by this, and replied with two tries, one of which they converted, giving them an 8—6 lead. Realising that something had to be done we pulled ourselves together, but try as we might we could not score. Hawkes just missed with an attempt at a drop-goal, and several times we looked as if we might score, but King's held out, and much to our surprise, and I think to theirs, they ran out the eventual winners.

Team: P. H. Davey, W. R. Juckes, W. Pierce Kelly, P. R. Hawkes, A. R. Corbett, J. H. S. Buchanan and A. Jones.

ANNOUNCEMENTS

BIRTHS

REAVELL.—On March 18th, 1945, to Doris Margaret (neé Swinburne), wife of Dr. Denys Reavell, of 50, London Road, Gloucester—a son.

RECENT PAPERS BY ST. BARTHOLOMEW'S MEN

BURROWS, H. J. "Rehabilitation in a Naval Hospital." *Lancet*, March 24th, 1945, pp. 370-372.

DEARLOVE, A. R. "Enforced Leisure: A Study of the Activities of Officer P.O.W." *Brit. Med. J.*, March 24th, 1945, pp. 406-409.

EDWARD, D. G. ff. (and Taylor, J., and Edwards, P. R.). "A New Salmonella Type: Salmonella Cardiff." *Brit. Med. J.*, March 17th, 1945, p. 368.

GISSANE, W. "The Organization of an Accident Centre." *Practitioner*, April, 1945, pp. 233-239.

GRIMSON, T. A. (et. al.). "Penicillin in Clostridial Infections." *Lancet*, March 31st, 1945, pp. 395-399.

HAWKING, F. "Local Effects of Intramuscular Injection of Solvochin." *Brit. Med. J.*, March 24th, 1945, p. 412.

HORDER, LORD. "Medicine and the State." *Lancet*, March 10th, 1945, pp. 295-298.
—— —— "Shall We Nationalize Medicine?" *Brit. Med. J.*, March 17th, 1945, pp. 357-360.
JONES, F. AVERY (and Bigby, M.A.M.). "Pregnancy and Diabetes." *Brit. Med. J.*, March 17th, 1945, pp. 360-363.
NOON, C. "Abdominal Injuries Arising from Road Accidents." *Practitioner*, April, 1945, pp. 227-232.
O'BRIEN, J. R. (et. al.). See Witts, L. J.
PETERS, R. A. (et. al.). See Witts, L. J.
SAVAGE, O. "Pulmonary Concussion ('Blast') in Non-Thoracic Battle Wounds." *Lancet*, April 7th, 1945, pp. 424-428.
TURNER, E. GREY. "The Soldier's Health Overseas: A Year's Statistics." *J. Roy. Army Med. Corps*, February, 1945, pp. 83-85.
WITTS, L. J. (and Higgins, G., O'Brien, J. R., Peters, R. A., and Stewart, A.). "Treatment of Infective Hepatitis with Methionine." *Brit. Med. J.*, March 24th, 1945, pp. 401-402.

EXAMINATION RESULTS

UNIVERSITY OF OXFORD

SECOND B.M. EXAMINATIONS, MICHAELMAS TERM, 1944

PHARMACOLOGY AND PRINCIPLES OF THERAPEUTICS
Hale, J. F.

MEDICINE, SURGERY AND MIDWIFERY
Walker-Brash, R. M. T.

SOCIETY OF APOTHECARIES

FINAL EXAMINATION, FEBRUARY, 1945

MEDICINE
Sheen, C. R. P.

GRANTED THE DIPLOMA
Sheen, C. R. P.

UNIVERSITY OF LONDON

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Waterlow, J. K.
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Jones, R. F. McN.
Pracy, R.
Thorne, N. A.
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